

O U T R E A C H



ORIGINS

E D U C A T I O N & O U T R E A C H

The Origins Program enjoys tremendous public interest. The Education and Public Outreach (E/PO) facet of Origins will continue to capitalize on this interest by offering students, teachers, families, and the general public a piece of our exploration. We will use the resulting public enthusiasm for space science to contribute solid improvements in science, mathematics, and technology literacy.

INFRASTRUCTURE

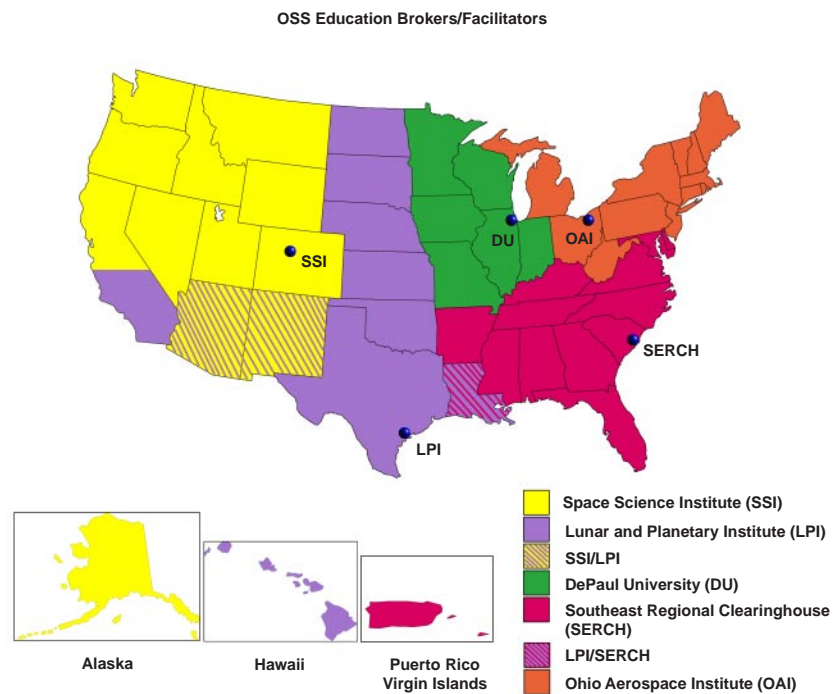
The Origins E/PO effort is built upon NASA's Education Program and Evaluation Framework and the Office of Space Science (OSS) education infrastructure network or "Ecosystem," which fosters a wide variety of highly leveraged education and outreach activities. Within the context of this Roadmap, we use the term "education" in its broadest sense, not just for the K-14 school classroom and in-service and pre-service teacher training. Education also extends to informal education that occurs in science museums, planetariums, libraries, and other lifelong learning environments.

OSS has adopted an aggressive course of action that guarantees that E/PO is an essential part of flight mission activities, with due attention given to it by project management and scientific personnel. Further, the plan insists that a significant fraction of scientists funded by OSS participate in education and outreach. Therefore, the OSS network serves as a distributed infrastructure for aggressively creating opportune partnerships for the production of educational resources. It serves as the network for disseminating all OSS educational materials, and it serves as the support structure for individual scientists as well as flight mission projects endeavoring to establish effective E/PO programs.

EDUCATION
AND PUBLIC
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AN ESSENTIAL
PART OF
NASA'S OFFICE
OF SPACE
SCIENCE
SUPPORTING
INFRASTRUCTURE.

The OSS education support network comprises four Education Forums aligned with the four scientific Themes, Origins being one, and a suite of Broker/Facilitators responsible for regional networks of activities, collaboration, and dissemination. The Origins Education Forum is co-located with the Office of Public Outreach at the Space Telescope Science Institute. Each Forum provides sustained coordination of the aggregate resources in the theme and synchronizes activities with other themes. The Broker/Facilitators serve as liaisons between the science community and the public, particularly educators, identifying opportunities, disseminating materials and information, and providing regional access to the OSS education network.

NASA's Office of Space Science has established a network of Broker/Facilitators to support E/PO efforts on a regional basis.



EDUCATION AND PUBLIC OUTREACH — THE ORIGINS FORUM PORTFOLIO

Our strategy for Origins E/PO captures the experience and recommended practices accumulated to date from the suite of innovative pilot projects funded through the OSS IDEAS grant program, from the E/PO activities fashioned by individual scientists in conjunction with their research grants, and from existing Origins mission-based educational programs. Our goal is to turn the collection of materials, activities, and resources into a cohesive Origins portfolio, yet capitalize on the unique attributes of the distinct missions and areas of particularized research.

Through the Origins E/PO program, we express the goals and objectives of our scientific research in terms understandable and relevant to the target audiences. These goals are communicated through Key Questions that resonate strongly with public curiosity. We articulate the investigative methods and the steps to develop appropriate, affordable flight technology to address these questions. For example, scientific research and technical challenges might be conveyed to students and teachers through hardcopy materials and online multimedia; content is transmitted to journalists through briefs, interviews, and related materials; and highlights, general information, and contextual background are relayed to the public through publications, websites, and interactive resources. Thus, individual resources, activities, and events will be built on an interconnected platform of theme-based background information and materials.

Our structure will allow us to showcase technology concepts and individual mission contributions to the field in the larger Origins context. Our program also will provide a natural vehicle to guide and “plug in” E/PO activities of individual scientists.

Public enthusiasm for space science reaches a crescendo during live participatory events. Our E/PO program and structure will foster a setting conducive to creating

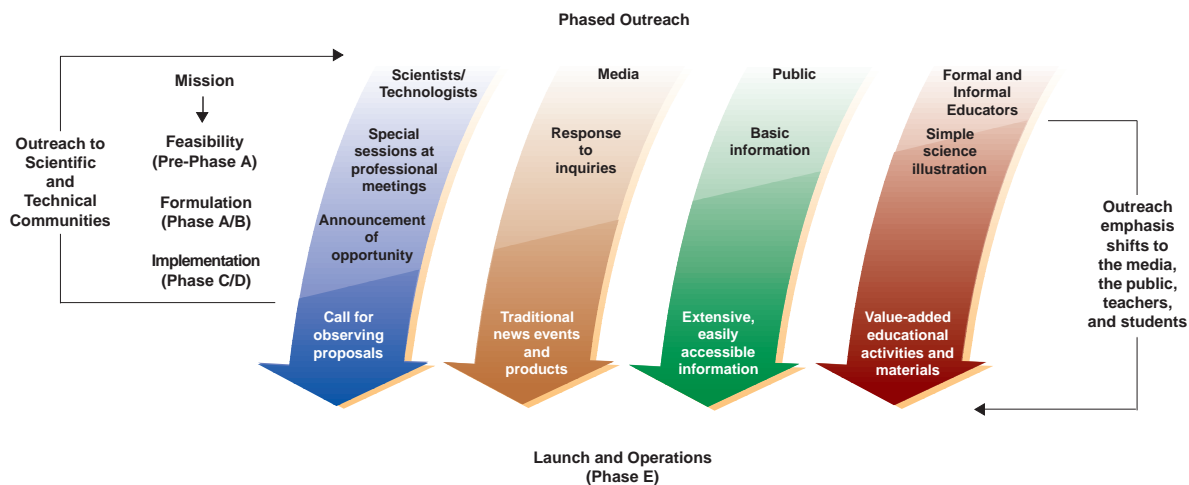
THE ORIGINS
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opportunities that include the public in the experience of discovery and investigative research. Such events provide agile, mediated access to scientific and technical human expertise.

E/PO PHASING

The overall concept of E/PO development mimics our development of missions. We build on precursor activities to evolve the E/PO programs for new missions. We ensure that outreach efforts are timed to the appropriate phase of a mission to build public support and realistic expectations for the ensuing research. Since the Forum provides guidance concerning what materials currently exist, or are planned, and what resources are appropriate, Origins developers can avoid duplication of effort, as well as form effective collaborations across missions. An important ancillary to our portfolio is a catalogue of education resources that will allow wide public access to materials through simple “one-stop shopping” interfaces. The electronic user interface to the catalogue will enable educators to identify space science resources by searching on criteria tailored to education needs. In the future, the creative use of adaptive knowledge-based agents (e.g., smart search engines) and other data-mining advances will provide efficient means for our education customers to find the exact resources they need.

The phases of outreach and education are depicted in the accompanying figure. The early activities involve outreach to the science community and generalized public information materials regarding the mission science goals and technology development. Technology milestones are highlighted. Multimedia resources and simulations allow the public to understand mission goals and possible research. The level of educational resource development is individualized to the particular mission and can include modules that provide participation in illustrative decision-making, simulations, and test scenarios.



At launch, mingled with the flurry of news events, live interactive events such as interviews and webcasts can take place, offering direct access to key scientific and technical experts related to the mission. As the mission evolves, educational resources based on research results and major discoveries are developed along with press releases and general information materials. Individual scientists develop materials, supported by E/PO grants associated with their research grants, and these items are woven into the suite of resources developed for the mission.

Outreach programs evolve as the mission life cycle progresses.

Finding the answers to the Origins Theme's defining questions will require ushering in new eras in science and technology in at least two disciplines — astrobiology and optical/infrared space interferometry. Given the burgeoning nature of these two fields, the Origins Theme will structure programs to facilitate expansion of the science community in these two areas. One way Origins will address this is through fellowship programs.

MICHELSON FELLOWSHIP PROGRAM

To encourage the science community to become familiar with optical interferometry, the Origins Program has created the Michelson Fellowship Program. The fellowships are named in honor of Albert A. Michelson, the first American to win the Nobel Prize in physics and the first to develop interferometry into a tool for ultraprecision measurements.

The Michelson Fellowship Program aims to bring together student researchers in all stages of their careers through graduate student and post-doctoral fellowships, undergraduate research opportunities, and summer schools, and by facilitating frequent and open exchange among all participants.

Now in its second year, the fellowship program has awarded 12 graduate student and post-doctoral fellowships at research institutions throughout the country. After the startup phase, we are planning to award five fellowships annually in addition to regular summer schools and opportunities for undergraduate students.

A team of undergraduate engineering and science students at Harvey Mudd College designed an infrared beam combiner unit (shown here in a laboratory setup) for the KIA. This collaboration between Harvey Mudd College and the KIA Project at JPL is an example of the activities sponsored under the Michelson Fellowship Program.



FUTURE

We will build upon NASA's Education Framework and the OSS network, the accumulated experience of the Origins missions, and the projects of individual Origins scientists to create a coherent tapestry of E/PO projects. The combined experience and infrastructure allows us to move forward in developing more aggressive and comprehensive methods for including the public in our enterprise. This includes the up-front enunciation of key scientific drivers and required technology. Web-casting and merged media (TV/web/wireless/high-speed communications) will become viable tools for including the public in NASA OSS missions as the technology advances.